

Persian translation of this paper entitled:

معماری میان‌افزا؛ رویکردی میان‌رشته‌ای برای طراحی در بافت تاریخی
نمونه موردی: مجموعه تجاری مشروطه در بافت تاریخی بازار تبریز
is also published in this issue of journal.

Infill Architecture: An Interdisciplinary Approach to the Design of Historic Context Case Study: Mashruteh Complex in the Historic Bazaar of Tabriz, Iran*

Minou Gharebaglou**¹, Ahad Nejad Ebrahimi², Ilgar Ardabilchi³

1. Faculty of Architecture and Urbanism, Tabriz Islamic Art University, Iran.

2. Faculty of Architecture and Urbanism, Tabriz Islamic Art University, Tabriz, Iran.

3. Faculty of Architecture and Urbanism, Tabriz Islamic Art University, Iran.

Received: 01/08/2018 ; revised: 11/12/2018 ; accepted: 06/01/2019 ; available online: 23/09/2019

Abstract

Problem statement: Studying infill architecture in historic contexts requires an interdisciplinary approach in an interactive framework involving architecture, urbanism, and restoration. Neglecting this interaction may cause irreversible damage to the values of historic contexts, such as the Bazaar Context of Tabriz, and hinder the realization of expectations from infill architecture.

Purpose: The purpose of this research is to explain infill architecture in historic Contexts via an interactive framework involving urbanism, architecture, and restoration. This will provide us with a deeper insight into the quiddity of infill architecture and help us formulate a design and evaluation model in the framework of an interdisciplinary perspective. Then, we will use this model to evaluate Mashruteh Complex as part of the Historic Bazaar Context of Tabriz.

Research method: The study uses a descriptive-analytic research method from an applied perspective. In this way, by studying the theories related to the concept of infill architecture in historic urban contexts, we will provide a model that explains interdisciplinary relations and, then, use it as the basis for evaluating the case study.

Conclusion: The results show that infill architecture should be considered in an interdisciplinary framework composed of urbanism (i.e., smart development, sustainable development and new urbanism), restoration (i.e., urban restoration and architectural restoration) and architecture (i.e., preservationism, contemporization and moderationism). An interdisciplinary approach contributes to explaining infill architecture in terms of reciprocating patterns among the three fields mentioned above. Our study of Mashruteh Commercial Complex in the Historic Bazaar Context of Tabriz from the perspective of infill architecture shows that the building conforms to urban restoration in terms of preservation; sustainable development and new urbanism in terms of urbanism; and, contemporization in terms of architecture. The results of our SWOT analysis also suggest that the addition of this new construct, along with the strengths and opportunities, has led to some weaknesses and threats which need to be eliminated based on strength-threat, strength-opportunity and weakness-opportunity axes.

Keywords: *Infill Architecture, Historic Context, Architecture, Preservation, Urbanism, Mashruteh Complex, Tabriz.*

* This article is part of Ilghar Ardabilchi's master's thesis titled "Examining the Levels of People's Perception of Infill Architecture in the Historic Contexts of Tabriz City (Case Study: Infill Architecture between the Historic Bazaar of Tabriz and the Margins of Chaykenar)"

under the supervision of Dr. Minou Gharebaglou and advisement of Dr. Ahad Nejad Ebrahimi at the Faculty of Architecture and Urbanism, Tabriz Islamic Art University.

** Corresponding author: +98 4135541812, m.gharebaglou@tabriziau.ac.ir

Introduction

Adding contemporary structures to a historic environment is not a new phenomenon but it was proposed for the first time in the 20th century as a method for efficient urban development with an emphasis on the maximum use of facilities available within urban contexts. Such a design requires greater sensitivity and the necessary specializations for it require defining the concept of infill architecture in an interdisciplinary framework. The interdisciplinary nature of this issue has an important impact on design approaches and guidelines. Insofar as each field studies this concept in terms of its own principles and also because this form of infill architecture occurs in historic and valuable environments, the damage caused by adopting a one-dimensional approach, instead of considering all the three approaches, affects both the physical and non-physical aspects of a historic context. Accordingly, the main concern of this research is to explain the approaches of urbanism, architecture and restoration toward infill architecture in historic contexts. Besides, the aim of the research is to develop a model based on proposed solutions in the fields of urbanism, architecture and restoration to serve as a benchmark for the evaluation of infill architecture in Mashruteh Commercial Complex in the Historic Bazaar Context of Tabriz, because this complex is of great importance for being located in a valuable context at both national and global levels. It should also be noted that this model, for its consistency with the goals of each field, improves the quality of infill projects and can be used in evaluations to show the positive and negative outcomes of each project and the path for its improvement. Additionally, this model can be used in planning and design processes.

Methods and procedures

The present study uses a descriptive-analytic research method from an applied perspective. This method helps the researcher better understand the conditions in order to make correct decisions (Sarmad, Bazargan & Hejazi, 2015, 81-82), depict the issue at stake and explain the reasons for the

problem. Therefore, through a review of the existing literature and the thematic background, we aim to collect and aggregate the theories related to the issue under study to formulate an interdisciplinary model of infill architecture in historic contexts. In addition to describing interdisciplinary relations, this model is the basis for describing and analyzing design and evaluation processes in infill architecture. In this study, we selected Mashruteh Complex in the Historic Bazaar Context of Tabriz as the case for infill architecture. Based on the proposed model and the SWOT analysis, the data obtained from our qualitative analysis of this complex can help extract the current conditions and provide a basis for developing strategies to improve the quality of Mashruteh Complex.

Infill Architecture in Historic Context

Infill architecture should be considered as a product of endogenous urban development because it provides a solution to the problems caused by excessive and scattered urban development. Urban infill development was proposed for the first time in 1976 at the Second UN Conference on Human Settlements (Habitat II) and it was officially defined in 1979 by the American Real Estate Society (Pourmousavi, Naser Mostofi & Shokouhi Bidhandi, 2014, 11). It operates by rededicating vacant urban lands or lands remaining after the demolition of old buildings to prevent urban development from extending to suburban spaces and agricultural lands (CABE, 2005, 258-259). This definition was enriched enough by the late 20th century. However, its scope did not exceed the emphasis on increased density and the revitalization of urban areas (Farris, 2001; Haughey 2001; Robinson & Cole, 2002). In terms of infill development, historic urban contexts are introduced as potential spaces for reuse or rededication. Historic contexts require greater sensitivity due to the significance usually associated with their physical and non-physical aspects and, thus, are a matter of special concern in the field of preservation/restoration. Nevertheless, what is important in this field is the

introduction of a new construct, shaped according to the architectural terminology of the 21st century (Worthington, 1998, 179) and in consistency with the new paradigm of activity and emerging technologies, to provide opportunities for urban development by future generations in already-existing areas (Torkzaban & Mohammad Moradi, 2011, 59). Therefore, in terms of style, form, mass, structure, method of construction, usage, spatial relations, materials, details, scale and proportions (Warren, Worthington & Taylor, 1998, 10-16; Torkzaban & Mohammad Moradi, 2011; Shahtemori & Mazaherian, 2013), new constructs must be in harmony with contemporary architecture and provide maximal correlation and coherence with adjacent areas with minimal visual damage (Worthington, 1998, 179). Most studies on this topic have provided solutions that the architect should consider in the design of infill buildings in line with preservation-related and, sometimes, architectural objectives. The present study aims to move beyond the limited scope of previous studies by adopting an interdisciplinary approach to infill architecture. Relying on a holistic perspective, this will ultimately lead us to a proper explanation for the design and evaluation model of infill architecture.

Different Approaches to Infill architecture in Historic Context

Since the addition of new structures to historic contexts affects the physical and non-physical aspects of the context, the use of multiple fields of study, including urbanism, Preservation and architecture, to ensure the final quality of the design from different perspectives appears to be a necessity. In other words, a historic context is basically an urban area and, thus, urbanism should be adopted as the primary approach to new constructs. New constructs should be considered as forms of urban development that are rooted in urbanism. Furthermore, historic contexts and constructs should be examined in the field of preservation. And finally, the designing of new constructs is the specialty of the architect.

Urbanism as a Field of Study

The physical, environmental, cultural, social, economic and psychological issues in architecture and urbanism arising from the chaos of the industrial revolution (the 18th century) and modernism (the late 19th and early 20th centuries) required new solutions that could help eliminate these problems. Infill development was proposed as such a new solution (Pourmousavi, et al., 2014, 11) and it was redefined after 1979. As outlined in Table 1, these definitions were based on specific keywords.

In the above definitions, the component of location indicates that infill development occurs in undeveloped areas, including vacant lots as a result of complete or partial building demolition, lands under development and, finally, lands under inappropriate utilization. The component of function, in its own turn, is directed at residential or non-residential uses and the reconstruction or reuse of underutilized buildings, even historic buildings, on condition of urban development in vacant lots (Listokin, Walker, Ewing, Cuddy & Cander, 2006, 13). This form of development is proposed as a strategy for endogenous development (Sharifian, 2010), which prevents scattered urban sprawl toward the margins by recourse to internal conditions and capacities. New urbanism, sustainable development and smart development all have emphasized infill development by focusing on the different aspects and principles of endogenous development. In response to traffic congestion, social tensions and economic problems, new urbanism was proposed in the 1980's as a means for "the protection of environmental resources, economic investment and social structure" (*ibid.*, 48-47). Sustainable development was proposed in 1989 to provide a solution for environmental and urban problems in economic, social and environmental fields (Mirmoghtadaei, Rafieian & Sangi, 2010, 45). And finally, smart urbanism was proposed in 1997, as an extension of new urbanism at the micro-scale, with a focus on the physical and spatial dimensions of the context (*ibid.*). The integration of infill development

Table 1. Definitions of infill development. Source: authors, based on McConnell & Wiley, 2010; Lehmann, 2012; Listokin et al., 2006.

Researcher(s)/ Organization	Year	Definition	Key components
Rehabilitation Engineering Research Center (RERC)	1982	Infill development refers to development in lots that never saw development despite and during continuous urban development.	Location
Schultz & Kasen	1984	Infill development refers to “residential or nonresidential development that occurs on vacant sites scattered throughout the more intensely developed areas of municipalities.”	Location; function
Falconer & Frank	1990	Infill development refers to a form of urban development in abandoned, deserted, unused plots in existing urban areas.	Position
Rosner & Rosner	1996	Infill development is “the housing construction, the process of developing open areas within an established area before developing outside the established area”.	Location; function
Institute and Congress for New Urbanism	2001	“Infill development is the creative recycling of vacant or underutilized lands within cities and suburbs”. That often involves the redevelopment of buildings and sites and the rebuilding of historic buildings for new uses.	Location; function; form
Wheeler	2002	“Infill development refers to construction of new housing, workplaces, shops, and other facilities within existing urban or suburban areas. This development can be of several different types: building on vacant lots; reuse of underutilized sites, such as parking lots and old industrial sites; and rehabilitation or expansion of existing buildings.”	Location; function; form
Envision Utah	2002	“Unlike reuse, infill occurs on smaller tracts of vacant land in otherwise developed areas.”	Location
Davis	2004	Infill is “development on vacant sites in urbanized areas and redevelopment of areas contiguous to urban development where all services and facilities are projected to have capacity to accommodate additional demand”.	Location
Moskowitz & Lindbloom	2004	“Infill is the development of new housing or other uses on scattered vacant sites in a built-up area”.	Location; function
McConnell & Wiley	2010	Infill development is a response to irregular urban sprawl and has a significant impact on urban density and form.	NA
Lehmann	2012	Infill development is reuse and replacement of worn-out and underutilized buildings and sites for new and better development	Location
Glossary	2016	Infill development is the simplest type of development or redevelopment of abandoned, deserted or underutilized lands in the ongoing process of urban development.	Location

with sustainable development, smart urbanism and new urbanism under the term endogenous development caused infill development to also take account of environmental, cultural and social issues from an economic perspective in addition to completing the principles of infill development (Table 2).

Preservation/Restoration as a Field of Study

Infill architecture in historic contexts should also be considered in connection with preservation/restoration studies. This necessity arises from the outcomes of infill architecture as a method of intervention in historic contexts. To achieve a comprehensive view of this field’s approach, we will summarize both groups of theorists and their manifestos:

• Theorists

Viollet le Duc (1814–1879) is one of the first theorists to have commented on infill architecture in historic

buildings. He believed that it was unacceptable to use designs or even materials that were characteristic of an era or style other than that of the historic building (Habibi & Maghsoudi, 2015, 37). Ruskin (1818-1900) also deemed it unacceptable to add new sections because it would prevent the recognition of an ancient building as a historical document (Falamaki, 2007, 18). Boito (1836-1914), however, proposed that a historic building can be rehabilitated and given new functions using new materials and styles, providing that its formal-stylistic features are preserved (Ablaghi, 2003, 85). Sitte (1843-1903) offered an intervention in which he established an appropriate connection between urban design and architecture (function, technology and aesthetics) (Siravo, 2011, 9). Beltrami (1854-1933) accepted new constructions that restore historic contexts to their initial conditions (Falamaki, 2007, 23).

Table 2. The approach of urbanism to infill architecture in relevant theories. Source: authors.

Theory	Year	Related principles and approaches	Source
Endogenous development	1980	The use of existing facilities available in and around the city for development projects	Mirmoghtadaei, et al, 2010
New urbanism	1980	Creating the possibility of smart transportation; increasing density; combined land use functions; pedestrian orientation; establishing urban connectivity; quality architecture and urbanism; creating neighborhood structures; focusing on sustainability; and, promoting quality of life.	Mohammad Doust, Khanzadeh & Zilayi, 2017
Sustainable development	1989	Protection of green spaces and agricultural fields; preventing urban congestion and sprawl; resolving traffic congestion; combined land use functions; prompting urban self-sufficiency; paying attention to human needs, communication and urban connectivity; giving priority to pedestrian and bicycle transportation; increasing the chances of selection; reducing pollution; creating open urban spaces; and, achieving distinction.	Ghorbani & Noshad, 2008; Heidari, 2013
Smart development	1997	Compact development in contexts ; combined land use functions and providing public services; improving urban transportation and communications; increasing popular engagement; increasing the chances of selection; creating a sense of place; establishing open urban spaces and agricultural fields; paying attention to natural aesthetics; creating distinction; and, carry out frugal methods of planning.	Rahmani & Shams, 2014 Zanganeh Shahraki & Hemmatzadeh, 2015

Dimensions	Criteria	Source
physical-environmental	Providing transportation choices; reducing and removing public parking areas; paying attention to the environment; creating urban design guidelines; rebuilding already-existing houses	Pourmousavi et al., 2014
Functional	Using shared parking lots; identifying areas with an inherent potential for infill development; creating a sense of safety with design elements; facilitating pedestrian and vehicle access to urban blocks	
Socio-economic	Involving the residents in all aspects; public declaration of the conditions of the pieces; collecting various taxes; creating public and private engagement for the provision of financial facilities; being informed about of existing political and historical controversies; various dwellings in different sizes and prices; revitalizing decaying societies; avoiding the displacement of residents during the implementation of the project; consolidating and supporting local businesses and nonprofit organizations; preserving the traditional image of neighborhoods	

Giovanni (1837-1947) believed that adding a new structure to a historic context was permissible only if it used a neutral, symmetrical and simple style, rather than a contemporary style, in relation to the contiguous historic context. This theory is subject to much criticism and opposition today (Mazaherian & Shahtemori, 2012). Geddes (1854-

1932) believed that the continuity of architectural history should be observable at the city level (Habibi & Maghsoudi, 2015, 61). He suggested that design should be based on the entirety of the existing context rather than the fleeting currents of a specific period (Siravo, 2011, 9). Le Corbusier (1888-1956) believed that the existence of several

Table 3. The theories of pro-preservation theorists on new structures in historic contexts. Source: authors.

Theorist	Birth-death range	Intervention area	Intervention method	Infill architecture approach			Explanation
				Rejected	Conditional	Acceptable	
Eugène Viollet-le-Duc	1814-1879	Single building	Improvement, renovation, reconstruction	■			disrupting the authenticity of the historical building and historic context by adding a new structure
John Ruskin	1818-1900	Single building	Improvement	■			preventing the recognition of a historic context as a historical document
Camillo Boito	1836-1914	City	Revitalization	Inadequacy of the theory for determining the approach			Recommending the use of new styles and materials
Camillo Sitte	1843-1903	City	Improvement & renovation			■	Integration of new and old building by observing the basics of improvement
Luca Beltrami	1854-1933	Single building	Reconstruction	■			restoring context to the original conditions by adding new structure
Gustavo Giovanni	1837-1947	City	Improvement & renovation		■		Using the style of the historic context, summarizing and neutralizing it for the design of a new structure
Le Corbusier	1887-1965	City	Reconstruction	■			The destruction of historic contexts and buildings and replacing them with contemporary architecture; Preserving a number of historically valuable buildings
Lewis Mumford	1895-1990	City	Improvement & renovation			■	Establishing links between the different contexts of the city
Patrick Geddes	1854-1932	City	Improvement & renovation			■	Using contemporary styles and creating continuity at the city level
Leonardo Benevolo	1933-2017	City	Reconstruction			■	Adding new buildings to historic contexts conditioned on the achievement of formal distinction, functional difference and balance between the new and the old

iconic buildings would be sufficient in a city and that the rest of the historic buildings and contexts should be replaced by new ones. However, this method had never been considered in infill architecture as a method of intervention (Habibi & Maghsoudi, 2015, 61). Mumford (1895-1990) believed that the main point of infill architecture was the ability to establish links between the different elements of a city (Pakzad, 2007, 403). Benevolo (1933-2017) also advocated the addition of new buildings to historic contexts conditioned on the achievement of formal distinction, functional difference and balance between the new and the old. Later, these ideas had a very influential impact on the approach of the Preservation field toward infill architecture and the

formulation of relevant strategies. The summary of the contents is given in Table 3.

• Manifestos and Charters

The Athens Charter for the Restoration of Historic Monuments (1931) was a manifesto of the International Congress of Modern Architects (CIAM) stipulating the avoidance of the styles used in past architecture (Habibi & Maghsoudi, 2015, 156). According to the Athens Charter (1933), acceptable new structures in historic environments are those built with respect to the surrounding structures and the volumes, colors and facades of adjacent structures. In addition, adding new structures requires a level of neutrality or inconspicuousness and the consideration of urban characteristics, landscapes and prospects

(Masoud & Beygzadeh Shahraki, 2012, 70). The resolution of the Gobineau Conference (1960) described reconstruction as the most appropriate way of intervening in historic contexts. This charter emphasizes the necessity of meeting the contemporary needs of citizens and residents in historic contexts. In the Venice Charter (1964), the UNESCO cautiously accepted reconstruction or intervention in exceptional cases if it seeks to reflect a pattern of use or cultural practice that sustains cultural and historical values (Habibi & Maghsoudi, 2015, 157). The resolution of the Paris Conference (1968) suggested that any intervention must be carried out in accordance with definite rules and regulations and monitored by the relevant organizations. The Rome Conference (1972) also called for attention to the structure and the framework of the city, along with attention to the originality and character of historic buildings and contexts in interventions. In addition, the Rothenburg Resolution (1975) suggested the use of innovative designs to enhance and strengthen historic contexts. The Vienna Memorandum on World Heritage and Contemporary Architecture (2005) and the Recommendation on the Historic Urban Landscape (2012) pointed to the need for adding new structures to historic contexts by sustaining the contextual values yet with a contemporary approach. In the Budapest Declaration (1972), the International Council on Monuments and Sites (ICOMOS) referred to the avoidance of imitation and of the reflection of historic styles in newly added structures in historic contexts. In addition, the Preservation Charter for the Historic Towns and Areas of the United States of America (1992) stipulated that new structures, despite the reflection of contemporary architecture, must be in harmony with the features of historic contexts. Furthermore, the International Cultural Tourism Charter (1999) proposed that the addition of new structures require paying more attention to design and construction methods and even to the use of local materials. Finally, the New Zealand Charter (2010) and the Madrid Conference (2011) proposed

the necessity of considering the context, sustaining coordination between new and old structures and avoiding incompatibility or the visual domination of the new structure. The summary of the contents is given in Table 4.

Architecture as a field of study

The field of architecture should adopt a multidimensional and comprehensive perspective toward the subject. Among the tasks of an architect while working in historic contexts are: preserving historic contexts and buildings; contributing to the continuity and integrity of the city; revitalizing and restoring urban life to historic contexts; responding to changing cultural, social and aesthetic values and public expectations; and, introducing contemporary architecture as well as adding the historical layer associated with it to already-existing historical layers (Macdonald, 2011, 13). Based on this multidimensional perspective, the field of architecture should pay special attention to the approaches adopted by the fields of urbanism and preservation in addition to architectural concepts and approaches. However, unlike the other two fields, architecture does not accommodate a consistent approach agreed upon unanimously by all the experts in this field. A study on different design patterns and styles clearly illustrates this instability. An exploration of various styles shows that there are three major orientations in infill architecture. With these three orientations toward infill architecture in historic contexts, it is possible to identify the objectives and achievements of each one.

The first approach, that is, preservationism, as the name would suggest, is based on the preservation of historic contexts and the maintenance of historical continuity. New structures are designed in accordance with the historical aspect of the context, which is essentially not conducive to contemporary layers. Stylistic or historical similarity, decorative façade design and hiding or retaining the façade² are the main components of design in this approach (Ghadiri, 2006, 20-34). On the one hand, if these

Table 4. The approach of pro-preservation organizations toward new structures in historic contexts. Source: authors.

Executive institution	Charter/conference	Date	Intervention area	Infill architecture approach			Explanation
				Acceptable	Conditional	Rejected	
CIAM	The Athens Charter for the Restoration of Historic Monuments	1931	Historic building		■		The use of past styles in new buildings has unfavorable consequences; a suggested use for such structures is to turn them into museums.
	The Athens Charter	1933	City	■			New structures should be designed in a contemporary, but neutral and explicit manner and in accordance with the contiguous historic context
	The Gobineau Conference	1960	City		Inadequacy of the theory for determining the approach		Estimating the contemporary needs of the citizens of old cities, and contemporization is essential.
UNESCO	The Venice Charter	1964	Building and historic complexes	■			New structures should not alter the relations in the context (volume and color). Equilibrium of the components and their relation to the environment are among the proposed principles
	The Paris Conference	1968	City	■			New structures should be Controlled via the establishment of rules and preventing the demolition of historic neighborhoods due to infill architecture
	The Rome Conference	1972	City	■			The authenticity and framework of the historic context Should be preserved and new structure Should avoid to damage to surrounding color and volume relations
	The Rothenberg Resolution	1975	City	■			New developments should be conducted according to the character and visual quality of dominant buildings
	Recommendation concerning the Safeguarding and Contemporary Role of Historic Areas	1976	City	■			New structures should be designed, if necessary, in a coherent and harmonious combination with a view to the protection of the integrity of the overall context; the components of this whole must be best connected to each other
	The Vienna Memorandum on World Heritage and Contemporary Architecture	2005	City	■			New structures should avoid a quasi-historical style and they should have the ability to create cultural continuity through interventions
	The Recommendation on the Historic Urban Landscape	2012	City	■			Contemporary interventions must be conducted in harmony with historic contexts
ICOMOS	The Budapest Declaration	1972	City	■			This is closely tied to the concept of urban design; the criteria for any method of design are the validity and authenticity of historic contexts.
	The Preservation Charter for the Historic Towns and Areas of the United States of America	1992	City	■			New structures can be built in a contemporary style, but in harmony with the surrounding environment in terms of appropriate scales, spatial structures and connections.
	The International Cultural Tourism Charter	1999	Place	■			Aesthetic, social, cultural, natural and environmental aspects are to be considered; the use of local materials, elements and styles in new structures is preferable
	The New Zealand Charter	2010	Single building and city	■			The complementary role of new structures in the original form or context; avoiding inappropriate or incompatible contradictions in form, scale, mass, color and materials
	The Madrid Conference	2011	City	■			There is a complementary role of new additions and extensions; new structure shouldn't be in competitions with the old; new structure should avoid the imitation of the context

techniques lead merely to an imitation of past architecture, the result will be in contradiction to preservation theories and resolutions. On the other hand, if the designer lacks the required experience, this approach will be the safest route to achieving acceptable results with minimal damage to the historic context.

The second approach, that is, contemporizationism, prioritizes the addition of contemporary buildings capable of expressing the values of contemporary humans. Therefore, the requirements of preservation and urbanism come only second to those of contemporization. Design styles in this approach usually lead to the avoidance or negation of the context and they often can be used to promote investment; turn the architectural work into an urban or even a global brand; attract tourists from around the world; help preserve the historic context; and, enrich the landscape of the city with the resulting visual diversity. In addition, the layers of contemporary architecture can be added to the historic context and contribute to its liveliness and dynamism (CABE, 2005, 5). Contradiction and unsustainable architecture are the two main methods used by the designers in this approach (Ghadiri, 2006, 43-67).

The third approach, that is, moderationism, gives equal importance to all the three approaches. With the help of neutral or zero-level architecture, implicit or reflexive architecture and the use of unifying lines (Ibid., 87-93), this approach proposes that the addition of contemporary buildings to historic contexts be conducted in a way that it does not contradict familiar forms so as to draw the attention of urbanists and preservationists as well. The summary of the contents is given in Table 5.

The Interdisciplinary Model of Infill Architecture in Historic Context

Although adding new structures to historic contexts originally arose from the field of urbanism, it should not be limited to this scope. Insofar as historic contexts are studied in the fields of urbanism, preservation and architecture, adding new structures to historic contexts should also be studied in an interactive framework involving all the three fields. In addition, urbanism, preservation and architecture are three related fields of study and that is exactly why any intervention in one of the three fields will inevitably affect the other two. Accordingly, infill architecture or the construction of new structures in historic contexts may be affected by all the three fields of urbanism, preservation and architecture just as all the three fields may be affected by the addition of new structures to historic contexts. Therefore, it is necessary to consider the interaction of urbanism, preservation and architecture in a comprehensive and reciprocal manner to capture not only the interdependence of the three fields but also the nature of designing and evaluating infill architecture in historic contexts because each of the fields need to be studied in connection and reconciliation with the other two (Fig. 1).

Case Study: Mashruteh Complex in the Historic Bazaar Context of Tabriz

Located on the west side of the Historic Bazaar Context of Tabriz, Mashruteh Complex is built on a land with commercial use, which used to be of commercial-residential use before the construction of the present-day infill building, and is made up of several commercial blocks and a parking lot. Mashruteh Complex is situated next to the Historic Bazaar Complex of Tabriz, which is one of the largest

Table 5. The approaches of infill architecture in the field of architecture. Source: authors.

Architectural approach	Design style	Design principles
Preservationism	Stylistic similarity; decorative façade design; hiding or retaining the façade	Preservation of historic contexts and the maintenance of historical continuity
Contemporizationism	Contradiction; unsustainable architecture	The addition of contemporary buildings in accordance with the values of contemporary humans
Moderationism	Neutral or zero-level architecture; implicit or reflexive architecture; the use of unifying lines	Equal attention to all the three approaches

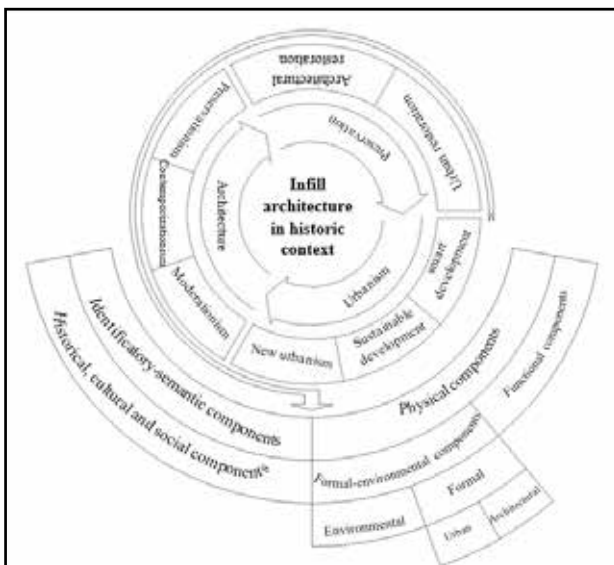


Fig. 1. Diagram of relations among urbanism, preservation and architecture in terms of infill architecture in historic contexts. Source: authors.

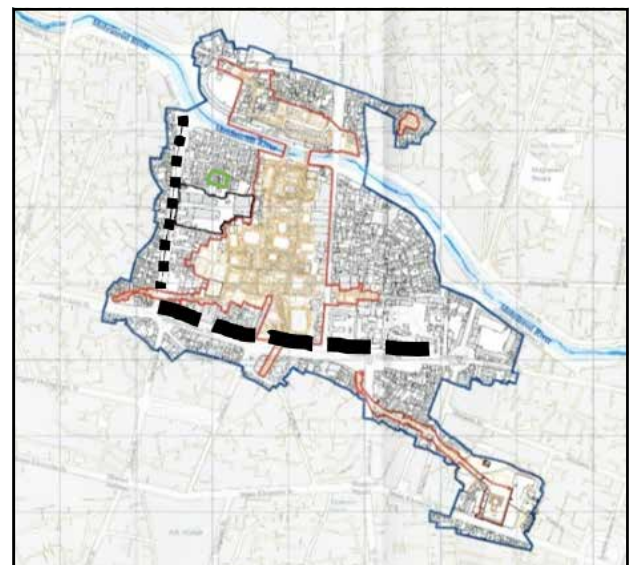


Fig. 2. The location of Mashruteh Commercial Complex in the Historic Bazaar Context of Tabriz. Source: www.whc.unesco.org

and most prosperous roofed commercial complexes in the world. It should also be noted that the Historic Bazaar Complex of Tabriz has played different roles in the formation of Tabriz (Behmaneshrad, 2010, 189-190) and has retained its formal continuity to date. The vast scope of the proposed design renders Mashruteh Complex into one of the most important cases of infill architecture in Tabriz (Fig. 2).

Results





Our analysis of Mashruteh Commercial Complex as based on Fig. 1 shows that this infill building is, in definition, associated with a reduced tendency for suburban development and a prioritized attention to preservation, pedestrian -and bicycle- oriented transportation systems, public transportation facilities, the human scale, the creation of distinctions and markings commensurate with the specific features of the region's architectural style, increased density and combined land use functions. All of these indicate that the project is focused on the various principles proposed in sustainable urban development, new urbanism and smart development. In addition, the goal of restoring the adjacent historic context is somehow related to architectural and urban restoration. Revitalizing the historic context helps create physical and non-physical connections across the past, the present and the future as

well as improve the quality of urban life. Furthermore, to create an appropriate combination of tradition and modernity and achieve a contemporary form of expression in the architectural design, the design of the infill building utilizes the motifs and materials used in the past; modern methods of construction used in contemporary architecture, including the use of concrete columns with embedded steel frames; and, defining use patterns that meet the needs of contemporary life, such as consumer electronics retailers. This makes it possible to more easily trace the historical continuity of the Bazaar Context of Tabriz at the same time as it helps retain a sense of compatibility between the historic context and the indices of infill architecture (Table 6).

Discussion

Although it would require a separate investigation to determine the success of the project in terms of design and implementation, Mashruteh Complex establishes some degree of connectivity and interaction as in accordance with the proposed research model. The advantages and disadvantages of this approach are summarized in Table 7. According to this table, the objectives of infill architecture include internal and efficient urban development, creating more consistency with the needs of contemporary citizens, preserving historic contexts and improving the quality

Table 6. The approaches of urbanism, architecture and preservation in relation to Mashruteh Complex. Source: authors.

	Indices	Picture	Explanation	
Urbanism	Smart Development Sustainable Development New Urbanism	<p>Combined land use functions; increased density</p> <p>Combined land use functions; increased urban density; facilitating urban communication; providing transportation facilities; compatibility with human needs; pedestrian orientation; using vacant lands in urban development.</p> <p>Establishing transportation facilities; combined land use functions; improving the design quality of urban public spaces; increased density; pedestrian orientation</p>	 <p>Legend: - Historic Bazaar - Mashruteh Complex - Religious use - green space - Administrative use - Service-provision use - Connectivity</p>	Functional and sanitary rehabilitation with the help of urban spatialization to preserve the historic nature of the Bazaar Context of Tabriz; urban spatialization to improve the living standards of the users.
	Urban Restoration	<p>Creating the right conditions for improving living standards; preservation and promotion of urban identity; physical-functional rehabilitation; socio-economic rehabilitation; promoting sanitation quality; establishing connections across the past, the present and the future.</p>		Improving the quality of urban design via spatialization; preventing vehicles from entering the complex; pedestrian-orientation
	Architectural Restoration	<p>Having an effect in the preservation and restoration of the Shrine of Imamzadeh Seyyed Jamal at the northern side of the complex and the Shrine of Ali Ibn Mujahid at the western side of the complex</p>		Redefining the old entrance of the Historic Bazaar Context of Tabriz; establishing connections across the past, the present and the future
Architecture	Preservationism	NA	<p>The use of rhythm; the use of bricks (as the most common materials found in the Historic Bazaar Context of Tabriz) in the construction of Mashruteh Commercial Complex; the use of concrete and stone structures in the implementation of the project; defining use patterns in consistency with contemporary needs.</p>	
	Contemporizationism	<p>Using a contemporary form of architectural expression based on the features of Iranian architecture</p>		
	Moderationism	NA		

of urban areas through the creation of contemporary designs aimed at linking the past and the present. This table clearly shows the interrelationship of the three fields in terms of the effects that each field exerts

on the other two. In addition, based on the status of the infill building, the above table contains some strategies to address the weaknesses and threats relying on the existing strengths and opportunities.

Table 7. A SWOT analysis for Mashruteh Complex in the Historic Bazaar Context of Tabriz. Source: authors.

		TO strategies	Internal factors	
SW strategies		<p>Studying in depth and narrowing down the scope of studies to historic contexts in all the three fields; identifying the needs, opportunities and threats; and, planning accordingly</p> <p>Project design Under the supervision of a team of specialists from all the three fields; the mastery of the architect over all the three fields; and, focusing further on infill architecture in historic contexts</p>	-O- Opportunities	-T- Threats
			<p>Increased willingness to invest in such projects; the necessity of the region for defining new land uses in accordance with contemporary needs; the need for increasing the quality of the urban space and the historic context considering that the region is a tourist attraction; no need for providing infrastructure; the need for planning for vacant lands in the region; and, the need for preserving the historic context using more modern methods</p>	<p>Discontinuity in the historic context; traffic congestion; air and noise pollution; low-width passages; opposition to this method of intervention from a group of experts and people; lack of sufficient experience in this method among Iranian experts; the dangers associated with brining heavy construction equipment to the historic context; and, the exhaustion of the historic context due to constructing a new structure</p>
Internal factors		-S- Strengths	SO strategies	ST strategies
		<p>Adding a contemporary layer to the already-existing historical layers; preventing changes in the cultural, social and economic aspects of the historic context; contributing to the preservation of adjacent historic buildings; contributing to sustainable urban development; taking advantage of existing potentialities to improve the conditions and the quality of the city in all the three fields; reducing the costs; and, saving time and energy.</p>	<p>Preservation and architecture; the possibility of introducing the project at the regional and international levels; and, drawing attention to the need for improving the quality of the city in the region</p>	<p>Coordinating the public and the specialists through making culture; and, taking advantage of experienced professionals in design and construction processes in this field</p>
		-W- Weaknesses	WO strategies	WT strategies
	<p>Discontinuity between the new structure and the old context; increased traffic congestion and associated problems in the transportation system; incompatibility between the changes and the historic context's granulation; the reduced volume of urban green/open spaces; the weakening of the physical role of the Historic Bazaar Context alongside Mashruteh Complex; the likelihood of increased willingness on the part of business-owners to work in the new complex; the possibility of violating the limits of historic buildings; and, creating a context for infill design through the avoidance or negation of the context and the resulting discontinuity between the historic context and the city</p>	<p>Policy-making and making culture for promoting alternative/public transportation methods; and, dedicating a portion of investments to studying the most appropriate method of infill architecture in relation to the historic context</p>	<p>Defining infill projects with the help of experienced teams; designing in according with preservationist methods and international charters; conducting design and construction processes jointly with specialists from all the three fields; and, relying on similar studies and past experiences, especially the projects implemented in Iran</p>	

Conclusion

In relation to the quiddity of infill architecture in the context of an interdisciplinary framework, the findings show that, until now, each of the three fields of urbanism, architecture and preservation

has approached infill development from its own perspective. Urban infill is derived from the theory of endogenous urban architecture in interaction with the principles of smart development, sustainable development and new urbanism. The result is an

approach with a universal perspective that aims to promote and improve the city as a whole. In the field of preservation, infill architecture must preserve and improve the quality of historic contexts and buildings based on the principles of urban and architectural restoration. The field of architecture, in addition to considering the goals of urbanism and preservation in the designing of new structures, is responsible for adding the contemporary structure and its respective layer. So, based on the priorities and policies, it proposes the approaches of contemporization, preservationism, and moderationism. What matters here are the reciprocal relationship and the constructive interactions that must be achieved among the three fields in the design process.

In the same line, our evaluation of infill architecture in the Historic Bazaar Context of Tabriz shows that Mashruteh Complex conforms to the principles of infill architecture proposed in the three fields of urbanism, urban restoration, and architecture. The contemporization approach to designing Mashruteh Complex requires a separate discussion in terms of quality and identity; however, it shows that urban planners and designers have considered the need for consistency between the historic context and contemporary functions and forms. Our interdisciplinary SWOT analysis for infill architecture also shows that Mashruteh Complex, despite the positive outcomes, including improved using conditions for the Historic Bazaar Context because of the addition of new parking lots and the creation of an appropriate context for attracting investment, has had negative consequences too. However, these disadvantages can be studied and eliminated using weakness-opportunity, opportunity-strength, strength-threat axes (Table 7).

Finally, we can conclude that the approaches of each of the three fields toward Mashruteh Complex, as a case of infill architecture in the Historic Bazaar Context of Tabriz, changes depending on the context, needs, desires, priorities and policies. Also, future analyses that adopt an interdisciplinary approach toward infill architecture can help evaluate

the factors that are involved in the designing of new infill buildings and provide a good basis for workable solutions and future directions.

Endnote

1. If a suggested technique for adding new structures to historic contexts is based on the imitation of the context, it will not be considered as a case of infill architecture; but, if the newly added structure takes the form of minimal architecture or other design techniques that emphasize clarity and simplicity, it will be categorized as a case of infill architecture.
2. Imitating historic contexts or buildings would render any technique as an invalid approach insofar as it would contradict the principles of the field of not only preservation but also architecture.

Reference list

- Ablaghi, A. (2003). The role of the restoration of historic buildings in the process of urban restoration and the experiences of the Civil and Urban Improvement Organization in this field. *Haft Shahr*, 1(12 & 13), 83-87.
- Behmaneshrad, J. (2010). *Dar jostosou-ye hoviati-e shahr-e tabriz [In search of the identity of Tabriz city]*. Tehran: Center for Studies in Urbanism and Architecture.
- CABE. (2005). *Design coding: testing its use in England*. London: Commission for Architecture and the Built Environment.
- Falamaki, M. M. (2007). *Revitalisation of historical manuments & cities*. Tehran: University of Tehran.
- Farris, J. T. (2001). The Barriers to Using Urban Infill Development to Achieve Smart Growth. *Housing Policy Debate*, 12(1), 1-30.
- Ghadiri, B. (2006). *New constructions in historic context*. Tehran: Iran cultural studies.
- Ghorbani, R. & Noshad, S. (2008). Smart Growth Strategy in Urban Development, Principles and Approaches. *Geography and Development*, 6(12), 163-180.
- Habibi, S. M. & Maghsoudi, M. (2015). *Urban renovation: International definitions, theories, experiences, charters and declarations, urban methods and operations*. Tehran: University of Tehran Press.
- Haughey, R. M. (2001). *Urban infill housing: Myth and fact*. Washington, D.C: Urban Land Institute.
- Heidari, J. (2013). *Principles and Concepts of Sustainable Development and Sustainable Urban Development*. Tehran: Azarakhsh.
- Lehmann, S. (2012). Sustainable Construction for Urban Infill Development Using Engineered Massive Wood Panel Systems. *Sustainability*, 4(12), 2707-2742.
- Listokin, D., Walker, C., Ewing, R., Cuddy, M. & Cander, A. (2006). *Infill development Standards and Policy Guide*. Retrieved from <https://www.nj.gov/dca/divisions/codes/alerts/>

pdfs/2006_6_rev2007_4_infill_dev_std.pdf

- Macdonald, S. (2011). Contemporary architecture in historical urban environment. *Conservation Perspectives–The Ghetty Conservation Newsletter on Historic Cities*, 26(2), 13–15.
- Masoud, M. & Beygzadeh Shahraki, H. (2012). *Infill building in historical urban*. Tehran: Azarakhsh.
- Mazaherian, H. & Shahtemori, Y. (2012). International Approaches to New Constructions in Historic Context (Study of Theories and International Agreements). *Naqshejahan- Basic studies and New Technologies of Architecture and Planning*, 2(1), 7-18.
- McConnell, V. & Wiley, K. (2010). *Infill Development: Perspectives and Evidence from Economics and Planning*. Washington, D.C: Resources for the future.
- Mirmoghtadaei, M., Rafieian, M. & Sangi, E. (2010). Ta'amoli bar mafhoum-e tose'e-ye mian afza va zarourat-e aan dar mahalat-e shahri [Reflection on the Concept of Interdisciplinary Development and its Necessity in Urban Areas]. *Shahrdariha*, 10(98), 44-51.
- Mohammadi Doust, S., Khanizadeh, M. A. & Zilayi, Sh. (2017). The Feasibility Applying the Principles of New Urbanism in Sustainable Recreation of Inefficient and Problematic Urban Areas by Emphasizing on Smart Growth (Case Study: Central Part of Ahvaz City). *Manegmant System*, 6(24), 215-230.
- Pakzad, J. (2007). *Trends in Urbanism: From Quantity to Quality*. Tehran: Armanshahr.
- Pourmousavi, S. M., Naser Mostofi, A. & Shokouhi Bidhandi, M. S. (2014). Recognizing the Rudiments and Administrative Strategies of Inter-escalation Development in Tehran City as a Dimension of Sustainable Urban Development. *Iranian social development studies*, 6(4), 37-57.
- Rahmani, A. & Shams, V. (2014). *Principles and Perspectives of Urban Development with Smart City Growth Approach*. Malayer: Islamic Azad University.
- Robinson & Cole. (2002). *Best Practices to Encourage Infill Development*. New York: National Association of Realtors. Retrieved from: [https://www.nar.realtor/smart_growth.nsf/docfiles/infilldevelopment.pdf/\\$FILE/infilldevelopment.pdf](https://www.nar.realtor/smart_growth.nsf/docfiles/infilldevelopment.pdf/$FILE/infilldevelopment.pdf)
- Sarmad, Z., Bazargan, A. & Hejazi, E. (2015). *Ravesh-hayeh-tahghigh dar oloum-e raftari [Research methods in behavioral sciences]*. Tehran: Agah.
- Shahtemori, Y. & Mazaherian, H. (2013). Design Guidelines for New Constructions in Historic Context. *Fine Arts*, 17(4), 29-40.
- Sharifian, E. (2010). Bahre giri az zarfiatha-ye darouni-ye shahr [Utilizing inner urban capacities]. *Manzar*, 2(10), 47-50.
- Siravo, F. (2011). Conservation Planning— The Road Less Travelled. *The Getty Conservation Institute Newsletter*, 26(2), 4–9.
- Torkzaban, Sh. & Mohammad Moradi, A. (2011). Architectural Design Criteria in Historical Fabrics. *Architecture in hot and dry climate*, 1(1), 53-66.
- Warren, J., Worthington, J. & Taylor, S. (1998). *The historical context: principles and philosophies*. Boston: Architectural press.
- Worthington, J. (1998). *Conservation through development*. University of York: Architectural Press.
- Zanganeh Shahraki, S. & Hemmatizadeh, S. (2015). *Moving Towards Urban Smart Growth; Principles and Policies*. Tehran: Arad Ketab.

COPYRIGHTS

Copyright for this article is retained by the author(s), with publication rights granted to the Bagh-e Nazar Journal. This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>).



HOW TO CITE THIS ARTICLE

Gharebaglou, M., Nejad Ebrahimi, A. & Ardabilchi, I. (2019). *Infill Architecture: An Interdisciplinary Approach to the Design of Historic Context; Case Study: Mashruteh Complex in the Historic Bazaar of Tabriz, Iran*. *Bagh-e Nazar*, 16(76), 65-78.

DOI: 10.22034/bagh.2019.142666.3713

URL: http://www.bagh-sj.com/article_93433_en.html

